

STATUS OF THE ITER EDA

by Dr. R. Aymar, ITER Director

This article summarizes the Report made to IC-11 on the progress in the ITER Engineering Design Activities in the period between IC-10 and November 1996.

Overview

The overall focus of the Project has been the preparation of the Detailed Design Report, Cost Review and Safety Analysis for presentation to IC-11. Following very intensive work, a 700-page document entitled Technical Basis for the Detailed Design Report, Cost Review and Safety Analysis was completed and circulated to Home Team Leaders and made available electronically to TAC Members and experts. Supporting Design Description Documents for individual ITER components were also made available electronically.

A major component of the DDR preparations was the completion, with valuable contributions from the four Home Teams, of a comprehensive assessment of ITER Safety and Environmental characteristics. The first draft of the Non-Site-Specific Safety Report (NSSR-1) was presented to safety experts from the Parties at the end of September (for details, see article on NSSR-1 preparation, in the Newsletter October issue, Vol. 5, No. 10). Information from NSSR-1 provides the basis of the safety section of the DDR which was discussed at an informal TAC-JCT assessment meeting in early October. On current plans, a second version (NSSR-2) will be prepared by the end of 1997. This document is expected to provide all the technical bases required by potential host parties to perform environmental impact assessments and to start the licensing process.

The DDR contains extensive coverage of the Physics basis for ITER which reflects the large volume of high quality work undertaken in the established framework for ITER Physics. A draft of the ITER Physics Basis Chapter was the subject of an informal TAC/JCT Physics Committee assessment held immediately after the IAEA Fusion Energy Conference in Montreal.

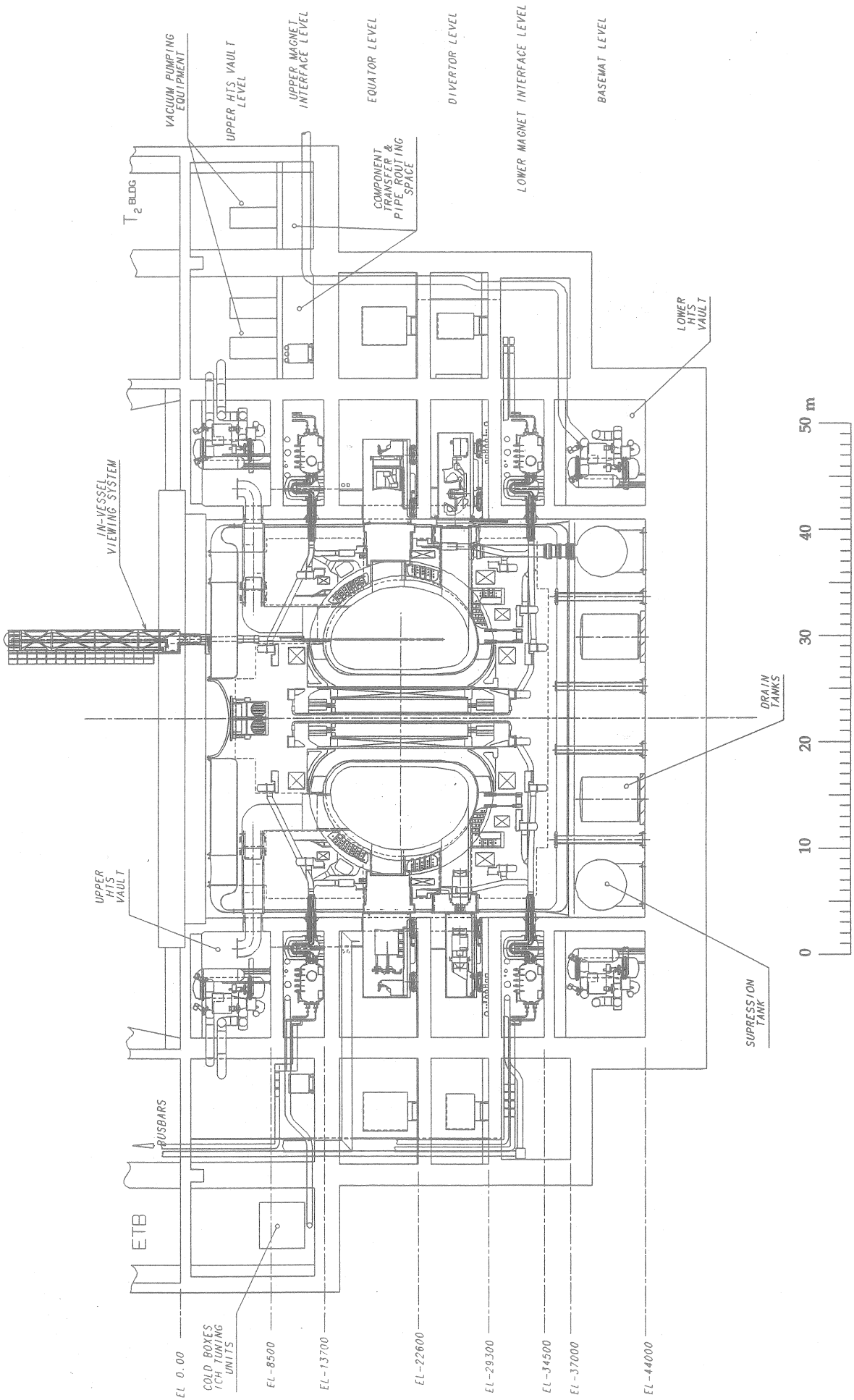
The sensitivity studies of variations from the Site Design Assumptions approved as part of the IDR package are being prepared for circulation to the Parties for review. Other subjects recommended for further study by the Special Review Group were incorporated in the DDR documents.

The project continues to be affected by budget difficulties in some Parties. As indicated to IC-10, measures have been taken by the JCT and Home Teams to mitigate the adverse effects as far as possible. The update of the Work Programme is based on revised assumptions about resource availability during the rest of the EDA.

Dr. R. Iotti, Administrative Officer, left the project with effect from 1 November 1996. Through his energy and expertise, Dr. Iotti has made a major contribution to the successful conduct of the EDA which is widely recognized and warmly appreciated.

Design Work

The next major milestone of the ITER EDA - the Final Design Report - is scheduled for January 1998. Plans are now in hand for the work leading to the preparation of that report. There will be a JCT internal design review meeting in January to take account of the DDR and any TAC/Council comments and to set the timetable for the year. The plans will be shared with the Home Teams and TAC as appropriate.



ITER TOKAMAK AND PERIPHERAL EQUIPMENT
 Source: "ITER Detailed Design Report, Cost Review and Safety Analysis", December 1996

Joint Central Team and Support

The status of the JCT is summarized by Joint Work Site and by Party in the Table below. Since the last Status Report, 5 (2 JA, 3 US) members left the team, and 8 new members joined (2 Canadian/EC, 5 JA and 1 RF).

Status of JCT Staff on site at end October 1996

Garching	Naka	San Diego	EC	JA	RF	US	Total
51	57	55	50 ¹⁾	47	29 ²⁾	37	163 ²⁾

1) includes five Canadians provided through the Canadian association with the EC Party.

2) in addition, 8 RF professionals have been requested, four of whom have arrived, under special VHTP arrangements.

The updated Work Programme now assumes that JCT staffing will peak at the level of about 167 from January 1997 to the end of the EDA. It will be essential to maintain this figure run on. The update of the Work Programme also emphasizes the need to maintain, for the duration of the EDA, Home Team design resources and the CAD, technical and secretarial support at the levels now reached.

Visiting Home Team Personnel (VHTP) Scheme

Operation of the VHTP Scheme was outlined in the Status Report to IC-10 (see the article on the subject in the Newsletter issue of July 1996, Vol.5, No. 7). The scheme continues to function well as a means of enhancing JCT/Home Team interaction and to offer some flexibility.

RF Design Support Contracts

The arrangements for RF design support contracts presented to IC-10 have developed as expected. A small number of further contracts were authorized shortly after IC-10 as planned. Work plans are being drawn up at technical level for contracts to be undertaken in the remainder of the EDA.

Following the advice of IC-10, it is proposed to increase the volume of work. A proposal for a supplementary Joint Fund Budget for this purpose was approved by IC-11.

Task Assignments

The status of existing Task Assignments was reported to IC-11. Major new tasks on Heating and Current Drive were supported at MAC-11 following discussions at the Home Team Leaders' meeting. There were ten new Task Agreements for Design and one R&D Task reported to IC-11, two of which were Voluntary Physics work with zero credit. Six tasks were VHTP task agreements. Another task was homework to a Home Team with zero credit to fulfil the SRG requests on the consequences of changes in site assumptions on design and cost. There was one technology R&D with 400 IUA in the safety area and one design task (2 PPY) in the Divertor area.

The updated task status is summarized in the tables below. After the MAC-10 meeting in June 1996, significant task modifications were finalized and unanimously supported by MAC through written procedure. The supported figures were reported to IC-10.

The latest figure of about 596 kIUA for the technology R&D tasks committed or to be committed to the Parties represents an increase of about 11 kIUA over the figures reported to IC-10. The number is about 25 kIUA less than the credits for identified tasks included in the Work Programme endorsed by MAC-8 and approved by IC-8 in July 1995. The design credit value now stands at 707.57 PPY (including 17.25 PPY of VHTP effort).

About 315 tasks, including both design and technology R&D, have been completed and the final reports have been submitted by the Home Teams. Total values of task allocations to date, including the VHTP tasks, are as shown below:

Type	IUA	PPY
TA Work Completed	125,255	231.30
L7 Tasks	329,800	
Other Tasks Committed/Ongoing	141,378	476.27
Totals	596,433	707.57

The pattern of assignment to Parties is summarized below:

Party	IUA	PPY
EC	193,166	196.05
JA	174,827	169.93
RF	95,417	157.20
US	133,023	184.39
Totals	596,433	707.57

ITER Public Information

The ITER Brochure has been well received and a second print run of 5,000 copies was made. A Japanese language version of the brochure has now been produced with the assistance and support of the Japanese Home Team.

Test Blanket Working Group

Following the discussion at IC-10, the Test Blanket Working Group has made considerable progress in its work. At TBWG-3 a tentative agreement was reached on port-sharing for test purposes consistent with operational and physical constraints of the ITER plant and ancillary systems. Separate Design Description Documents have been produced for the proposed test modules.

ITER Physics

The significant progress made in ITER Physics is reflected in the Physics section of the DDR.

Following the ITER Physics Committee meeting in October, a letter was sent to the heads of major fusion laboratories seeking assistance in developing and strengthening the physics databases deemed "Urgent" by the Physics Committee, i.e.:

H<=>L Power Threshold
H-mode Thermal Confinement
Critical shots for profile database

Divertor Scalar Database
ELM Properties Database
Halo Current Database

The helpful response from the laboratories to previous requests for assistance with Halo current data was recognized at the IAEA Montreal Conference. It is hoped that there will be a similar timely and generous response on the broader front.

THIRD TECHNICAL MEETING ON QUALITY ASSURANCE

by A. Girard, ITER Joint Central Team

The Third Technical Meeting on Quality Assurance (QA) was held on 25-27 November 1996 at the ITER Garching Joint Work Site (JWS). The objectives of the meeting were to review the progress made in the implementation of QA and to identify weak areas which require improvement. The focus was on the Large R&D Projects assigned to the EU Home Team (HT) or placed under the responsibility of the Garching JWS.

Progress in implementing QA

Although the degree of development and approaches to QA may differ, every HT has now set up a system to ensure the quality of their contribution to the Large R&D Projects.

There was a consensus among Large R&D Project Task Officers that the quality assurance activities have made a positive impact on the control of the projects, and now form an essential part of the project management.

- ◆ A review of laboratory and industry QA had been completed in the US HT, and further assessments and audits are underway.
- ◆ The RF HT has set up a high level QA group, including industry and Minatom representatives. It is expected that the RF HT QA Plan and relevant procedures would be implemented now that program funding had been restored.
- ◆ Audits of the QA system are being prepared and will be carried out soon by the JA HT. The JA HT presented the table in use to control the status of the QA documentation produced by the JA HT.
- ◆ Supervision of the implementation of the L2 project (Toroidal Field Model Coil) is performed by the consortium (AGAN) of the four major suppliers. The QA system used by AGAN is formalized in a QA plan.
- ◆ A detailed investigation has been performed for the L4 project (Blanket Module Remote Handling) to identify the most suitable QA requirements.
- ◆ The L7 project (Divertor Module Remote Handling) makes extensive reference to ISO 9000. Details were given regarding the QA supplied by SPAR/CFFTP.
- ◆ The coherence of the documentation supplied with the L1 conductors (Central Solenoid Model Coil Project) has been significantly improved.
- ◆ JCT Large R&D Projects Task Officers expressed the wish to have available a control system for the review and approval of technical documents and modifications.
- ◆ Concern was expressed regarding the difficulty of getting quality input data for the ITER Material R&D Data Bank.
- ◆ A task team had been created by ASME to develop and application of ASME/NQA (Nuclear Quality Assurance) to be used as a guidance for fusion. This would be voluntary for ITER.

Main recommendations and future work

- ◆ It was acknowledged that a substantially enhanced QA program would be required for the procurement of ITER long lead items and for ITER construction. The final document shall be part of ITER EDA deliverables. It was agreed that JCT San Diego QA and US HT QA would prepare a preliminary draft sent to JCT and HTs QA well ahead of the next QA meeting.
- ◆ It was recognized that the importance of the control of documentation packages is frequently underestimated. At the next QA meeting JCT San Diego QA and US HT QA will present the experience gained in the management of documentation packages for the L1 Project.
- ◆ Instances where manufacturers were not accurately informed ahead of time of the implications on their manufacture of foreign rules and regulations applicable to production to be sent abroad were reported. Regarding the particular case of the L1 project, the US HT intends to organize with all involved a review of the regulatory requirements applicable to L1 and identification of the implications.
- ◆ At the next QA meeting the US HT will inform the participants of their review of computer software using a graded QA approach and of the work performed by ASME.

The RF HT has offered to host the next (4th) Technical Meeting on QA. The tentative duration, date and location, are 3 days between 15 and 18 April 1997 in St. Petersburg.

LIST OF PARTICIPANTS

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